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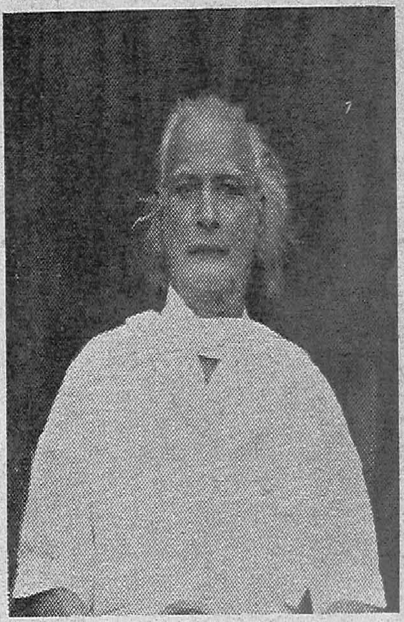
Editorial

One of the important problems that has attracted the keen interest of investigators from very early times is the question of dormancy in plants. Dormancy in *sen sulato* is applied to cases where a tissue that can develop or elongate does not do so. In this sense it has been found in a number of plants, from herbaceous to woody ones. This character has been taken advantage of in plant propagation and in horticulture, especially in the temperate climates. In tropics the climatic conditions are very favourable for a continued growth, yet there are plants which show the character of dormancy in these climates also. Apart from its theoretical interest its importance in commercial production and the problem of its control have been attracting much attention recently. Dormancy can be imposed artificially by environmental conditions but reverts to the normal when such conditions are removed. It can be internal to the plant (not affected by the environment) induced by the lack of certain substances reaching the apex and thus inhibiting growth or it can be confined to the growing point itself. The problem has two contradictory aspects in practical application viz., in some of imposing and in others breaking of dormancy. In tropical climates it becomes more significant in the cultivation of temperate and subtemperate plants such as grapes, apples, citrus etc. In these plants the question is one of enforcing dormancy to restrict the number of flushes and prevent exhaustion of plants. In some cereals as in paddy, continued rainfall during harvest period as in the West Coast causes the mature grains to germinate in the ear. A similar problem is found in groundnut also. Here again inducing dormancy becomes a necessity. The characteristic behaviour of mangoes and similar tropical fruit plants is well known. One would like to have a uniform crop each year than have over-abundance of it every alternate year or so. Here it is a question of control of dormancy and inducing or breaking it at required times. Smudging or smoking has been used in Philippines to force the buds of mango

to open, while it has been used to defoliate and thus induce flowering in jasmines in India. In Nilgiris the problem has been to break dormancy in potatoes and this has been achieved by treatment of the seed with carbon-disulphide. Thus the subject becomes complex and many-sided.

The problem therefore, has been tackled from various angles and has been the subject of much controversy. Several theories have been put forward such as gene control, nutrtional control, proportion of sugars present and the consequent rise in rate of respiration, concentration of certain inhibitory substances in stem apices, photoperiodism and more recent the action of growth-promoting substances etc. Which of these are primarily responsible or whether it is a combined effect of some of them and how far they can be made to act on the plants and produce the desired changes independent of season are important questions awaiting detailed study.

The Andhra Agricultural Journal: The first issue of this bi-monthly journal of the Andhra Agricultural Union containing short reviews of previous work and work to be tackled in the new State in the several agricultural activities has been published with a neat and attractive get-up. It is to be congratulated that the general public has also evinced interest in the starting of the journal by rendering financial assistance. The journal intends to publish articles of scientific also of general interest in agriculture. It is a welcome one since in India there is an insufficiency of such media, for publishing of scientific work and it is hoped that this new journal will come up to the exacting standards of scientific periodicals.



The Late
Rao Bahadur S. Sundararamier

Assessment of Soil Fertility Level — I.
Rapid Tests for available Phosphorus

by

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Introduction: This study was undertaken with a view to obtain a quick assessment of plant nutrients in the soil by some of the well-known rapid methods and thus reduce the time involved in analysis of these nutrients by the routine time-consuming methods now in vogue in this laboratory. Phosphorus, representing as it does one of the "big three" in plant nutrients was first taken up for estimation by these rapid methods.

Phosphorus in soils is the key to our fertility problems and plays a major role in the physiology of the plant. The phosphorus that is of importance to plant nutrition is not the net total phosphorus present in the soil but it is the phosphorus which is soluble and easily accessible to plant roots, herein called "available phosphorus". From time immemorial, agricultural chemists have tried to devise ways and means of assessing this fraction of the phosphorus present in soils. Consequently many methods based on empirical presumptions were evolved. These methods put forth certain soil extractants of different compounds and of different pH according to the tentative assumptions made by the author of the method to simulate conditions prevailing at the root zone of the plant in nature. The time-consuming routine method so far used in this laboratory is the Dyer's 1% citric acid method (7). In this method 1% citric acid in the proportion of 1 : 10 soil to extractant was adjudged to simulate the extraction of P_2O_5 at the root zone of the plant. In the five rapid methods studied in the present work other extractants to simulate root absorption were employed as detailed under "Materials and Methods" below. In the Dyer's citric acid method the period of extraction was for 12 hours and the subsequent evaporation and ignition to destroy citric acid and remove silica by dehydratihg it were all very laborious and time-consuming. The rapid methods cut short the period of extraction and could be utilised for colorimetric estimation of P_2O_5 by Truog's method (2,6).

The comparison of methods of assessing the "available phosphorus" in soils was done in three stages. Experiment I was a straight comparison of the values obtained by the different

methods in the well-known soil types of the Madras State. Experiment II was to assess the presence or absence of interfering ions in colour development in the soil extracts obtained by the different methods and Experiment III was designed to obtain a correlation of the estimates made by the different methods with actual grain yield of the crop grown on the soils.

Materials and Methods. I. *Method of extraction:* Of the methods available in literature, the following five methods were taken up for study:—

Name of method	Extractant	Duration of extraction	Ratio of soil to extractant
1. Morgan's method (1)	Sodium acetate and acetic acid pH 4·8	2 hours	1:40 (2·5 g. to 100 ml.)
2. Truog's method (2)	0.002N. H_2SO_4 buffered with $(NH_4)_2SO_4$ to pH 3	30 minutes	1:200 (1 g. to 200 ml.)
3. William's method (3)	N/2 acetic acid pH 3	2 hours	1:40 (2·5 g. to 100 ml.)
4. Burriel's method (4)	Acetic acid÷H_2SO_4+ $CaCO_3$+$MgCO_3$. pH 3·25	5 minutes	1:100 (1 g. to 100 ml.)
5. Olsen's method (5)	0·5 Molar $NaHCO_3$ adjusted *to pH 8·5 with NaOH*	30 minutes	1:20 (5 g. to 100 ml.)

These five rapid methods were compared with Dyer's 1% citric acid method.

II. *Method of estimation:* The P_2O_5 in the extracts obtained by the various rapid methods listed above were estimated colorimetrically by the Truog and Meyer method (6) using a Spekker Absorptiometer for measuring the colour developed with 4·0 ml. of ammonium molybdate sulphuric acid solution and 0·8 ml. of freshly prepared 1% stannous chloride in a suitable aliquot of the extract, made up to 100 ml. In the Dyer's 1% citric acid method alone the usual volumetric method of estimating P_2O_5 was followed.

Materials: The following surface soils representing typical soil types of the Madras State were utilised for the comparison of the various techniques:

Type		No. of samples	Sample No. and location
1. Black soils	...	3	2791, 2793. 2795/'52–'53 Siruguppa
2. Alluvial soil	...	3	S. S. 543, 546, 542/'51–'52 Punavasal, Tanjore dt.
3. Laterite soil	...	3	1374, 1380, 1408/'52–'53 Pattambi.
4. Red soil	...	10	261 to 270/'53–'54 Coimbatore.
5. Calcareous red soil		10	910 to 919/'52–'53 ,,

Experiment I: Comparison of estimates of available phosphorus:—

Procedure: The above soil samples were analysed for "available phosphorus" by the five rapid methods and the Dyer's 1% citric acid method.

Results: The results are presented in table I. From the results obtained it will be seen that no one rapid method can be recommended universally for all types of soils. A comparison of the values obtained by the different rapid methods with those of Dyer's shows, that while in the case of red and alluvial soils the latter method always gives higher values than the former, in the case of black and laterite soils Dyer's values are lower than those obtained by rapid methods. Considering the unsuitability of a universal application of Dyers' 1% citric acid method to all types of soils, the criterion of maximum extraction was found to be more helpful in fixing the best rapid method for a particular type of soil and has also enabled us to bring the various soil types under two broad groups viz. calcareous and non-calcareous. For calcareous red and black soils, William's N/2 acetic acid method at pH 3·0 or Morgan's N/2 acetic acid at pH 4·8 and for non-calcareous red soils, laterite soils and alluvial soils, Truog's 0·002 N. H_2SO_4, seem to be the best rapid methods of extraction of available P_2O_5.

Experiment II. Recovery of added phosphorus in soil extracts:—

Procedure: With a view to see that no interfering ions were present in the soil extracts obtained by the five rapid methods, known amounts of phosphate solution were added to the soil extract and the estimation done as before with the Spekker Absorptiometer.

Results: The results of analysis are presented in Table II. From the data presented therein, it will be clear, that in no case was there any interfering ion, which would mar or enhance the colour development in the colorimetric estimation of the soil extracts obtained by the rapid methods, as nearly 90 to 100% of the added phosphorus were estimated by the colorimetric method.

Experiment III: Rapid estimates of available phosphorus correlated with grain yield:—

Procedure: All the methods tested in this study were based on tentative assumptions which according to the author of the technique was said to simulate the natural conditions at the root zone. So, this experiment was initiated to compare the values obtained by the various rapid methods with the soils of the old and

new permanent manurial plots at the Central Farm, Coimbatore. The fertility status of these soils was known definitely, having the same type of manurial treatment for more than two decades. The average grain yield from the last five crop seasons were computed.

Results: These grain yields with the "available P_2O_5" estimated by the different methods are presented in Table III and the same brought out graphically in plates 1 and 2. From the data it will be clear, that in the case of red soils as in the old and new permanent manurials, the rapid methods of estimating available P_2O_5 except that of Olsen's (5) reflect the fertility status of the soil.

Summary and conclusions: 1. This study was undertaken to try out some of the rapid methods of estimating "Available Phosphorus" in soils.

2. From the first stage of the study detailed under Experiment I, it was seen that there is no one rapid method capable of adoption for all types of soil. The N/2 acetic acid method either of Williams at pH 4·8 or of Morgan's at pH 4·8 was good for calcareous soils and the Truog's 0·002 NH_2SO_4 method was suitable for non-calcareous soils.

3. All the soil extracts obtained by the different methods were studied for the presence or absence of interfering ions in colour development in the colorimetric estimation. As 90 to 100% of the added phosphates were recovered in the colorimetric estimation it was concluded that the soil extracts obtained by the different methods did not have anything which would interfere with the colorimetric estimation.

4. In the case of red soils, a comparison of the estimates of the available phosphorus with actual grain yield of the crops raised on the soil was made and was found to agree closely in four out of the five rapid methods studied.

Acknowledgment: The authors are thankful to the Government Agricultural Chemist for all facilities and guidance given in the pursuit of this study.

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PLATE I

GRAIN YIELDS OF O.P.M. COMPARED WITH ESTIMATED AVAILABLE P_2O_5

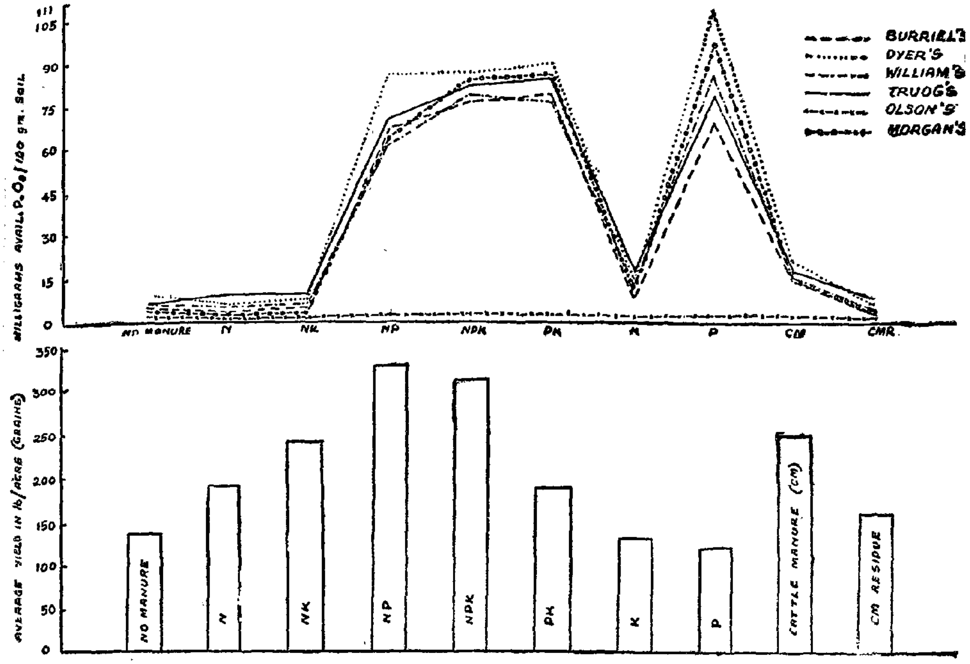

PLATE II

GRAIN YIELD OF N.P.M. COMPARED WITH ESTIMATED AVAILABLE P_2O_5

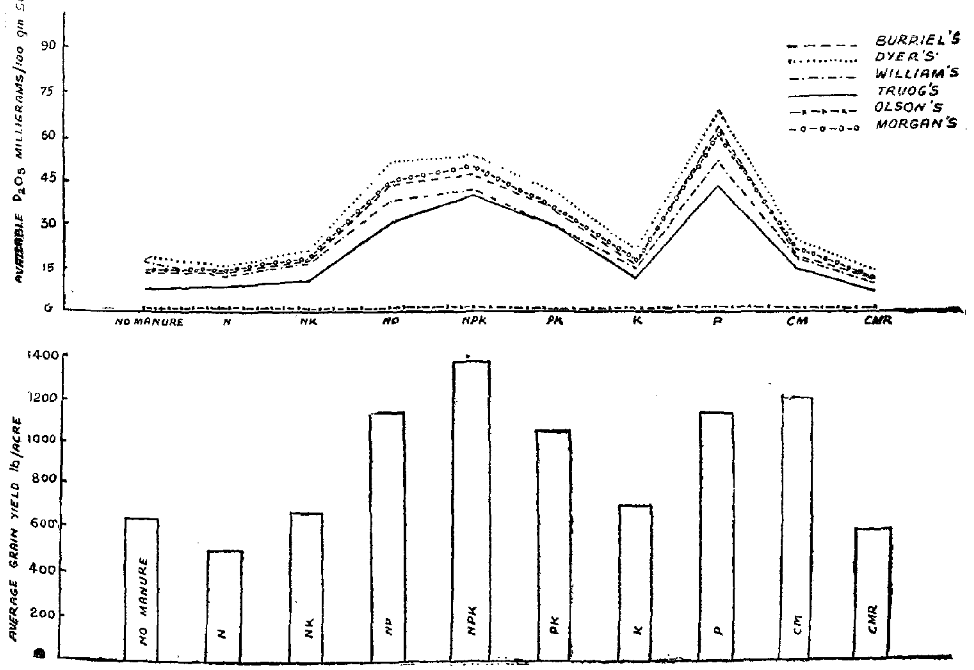

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TABLE I

Showing the available P_2O_5 in different soil types as estimated by different rapid methods and Dyer's method

(Milligrams P_2O_5/100 gram air dry soil)

S. No.	Lab. No.	Truog's method	William's method	Burriel's method	Morgan's method	Olsen's method	Dyer's method
	Black soil from Siruguppa :						
1	2791/52–53	3·2	9·0	6·3	6·2	0·8	3·4
2	2793/52–53	2·8	9·5	6·5	6·6	0·9	3·5
3	2795/52–53	3·0	9·1	6·6	5·0	1·3	5·4
	Alluvial soils of Tanjore deta :						
1	543/51–52	2·0	0·6	0·55	1·2	0·8	3·3
2	546/51–52	1·7	Nil	0·55	0·8	0·8	3·5
3	549/51–52	1·5	Nil	0·20	0·8	0·4	1·2
	Laterite soils from Pattambi :						
1	1374/52–53	5·6	0·6	2·3	2·4	5·6	1·8
2	1380/52–53	4·0	0·5	1·3	2·0	3·3	2·3
3	1408/52–53	2·8	0·5	0·75	1·2	2·3	4·9
	Red soils from Coimbatore :						
1	261/53–54	5·4	5·4	4·6	4·6	0·6	9·3
2	262/ ,,	7 3	4·4	4·0	3·4	0·2	6·4
3	263/ ,,	8·4	4·8	5·3	4·2	0·6	7·9
1	913/52–53	8·0	16·5	14·5	14·6	0·7	18·4
2	911/ ,,	9 2	11 9	12·7	12·8	0·7	16·7
3	912/ ,,	11·1	16 5	16·5	17 6	0·7	20·8

TABLE II.

Showing the percentage of Recovery of Phosphate added to the Soil Extracts obtained using Different Extractants.

S. No.	Lab. No.	Truog's		William's		Burriel's		Morgan's		Olsen's	
			Average		Average		Average		Average		Average
1.	Red Soil O. P. M. 263/54–'54.	98·8	99·4	95·5	97·8	96·7	92·7	100·0	100·0	78 9	90·4
2.	do. 278/ „	100·0		100·0		88·7		100·0		101·8	
3.	do. N. P. M. 912/52–'53.	100 0	100 0	97 0	97·05	95·4	95·55	94·3	94·1	93·2	94·0
4.	do. „ 917/53–'50.	100·0		97 1		95·9		93·9		94·7	
5.	Black Soil, Siruguppa	93·6	96·8	100 0	100·0	99·2	98·6	95·2	95·05	100·0	92·7
6.	do. Anuppapatti	100·0		100 0		98·0		94·9		85·4	
7.	Laterite Soil, Pattambi	90·5	95·25	82·8	85·4	85·1	93·4	91·8	93·8	93·6	93·2
8.	do. „	100·0		88·0		101·6		95·7		92·8	
9.	Delta Soil, Punavasal	93·0	96·15	88·9	94·1	87 2	98.8	87·5	92·85	100·0	94·9
10.	do. Mayavaram	99·3		99·3		96·4		98·2		89·8	

TABLE III

Showing the average grain yields in the old and new permanen manurials as compared with the available P_2O_5 in the soil estimated by different methods

	Available P_2O_5 Milligrams/100 gm. soil						Average yield of grain lb/acre	Remarks
	Truog's	William's	Burriels	Morgan's	Olsen's	Dyer's		
Old Permanent Manurial Soils:								
Lab. No. 261/53-54.	5·4	5·4	4·6	4·6	0·6	9·3	140·5	Unirrigated
,, 262 ,,	7 3	4·4	4 0	3·4	0·2	6 4	190 9	
,, 263 ,,	8·4	4 8	5·3	4·2	0·6	7·9	238 3	
,, 264 ,,	70·0	60 6	63·5	62 0	2·0	83 3	332·2	
,, 265 ,,	80·3	77 0	73 5	77·5	1·8	85·3	308·1	
,, 266 ,,	84·3	76·0	78·5	78·5	2·8	89·5	186 5	
,, 267 ,,	17 3	10·7	9·9	10·2	0·7	14·1	133·4	
,, 268 ,,	84·0	91·2	78·5	94·5	2·8	106·8	128·0	
,, 269 ,,	19·0	16·0	15·4	16·2	1·1	21·0	251·4	
,, 270 ,,	8·0	4·4	4·9	4·2	0·6	7·4	160·2	
New Permanent Manurial Soils:								
Lab. No. 910/51-52.	8·0	16·5	14·5	14·6	0·7	18·4	639 6	Irrigated
,, 911 ,,	9·2	11·9	12·3	12·8	0·7	16·7	513·2	
,, 912 ,,	11·1	16·5	16·5	17·6	0·7	20·8	672·2	
,, 913 ,,	31·0	38·0	43·0	43·5	1·5	52 0	1,158·8	
,, 914 ,,	41·0	42·0	47 0	50·0	1·5	53·0	1,395·6	
,, 915 ,,	30 0	30·0	36·0	35·0	1·3	43·0	1,071·4	
,, 916 ,,	13·2	16 0	15 7	16·2	0·7	20·9	692·6	
,, 917 ,,	43 0	52·0	62·5	60·0	1·9	68·8	1,148·2	
,, 918 ,,	14·8	19 0	18·9	20·8	1·3	24·6	1,210·2	
,, 919 ,,	8·6	10 0	10·7	10·8	0·7	14·7	548·6	

ERRATUM

Vol. XL, No. 12 1953 P. 550, para 2. line 10 from above for 4% DNOC read 40% DNOC.

A Preliminary Investigation on the Preparation of Vegetable Milk from Oilseeds and Pulses

by

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Introduction: Milk prepared from vegetable sources, chiefly the soya bean, has been in use in China, Japan. Korea and other Eastern countries from very early times Children are fed on this milk substitute, and medical opinion in China is in favour of soya bean milk as a valuable substitute for natural milk in promoting growth and development. Bowdidge in his book on the "Soya bean" describes its effect on western palates as "nauseating to say the least". Different methods have been evolved in these countries for the preparation of soya bean milk, mainly consisting of washing the beans three times in water, soaking in water for 12 to 24 hours, heating to boiling point, grinding in a mortar and straining through a bag made of linen.

In the West there had been only sporadic attempts at investigation into the manufacture of milk substitutes, the probable reason being the availability of natural milk in abundance. During the World War I a synthetic vegetable milk was put on the market under the name "Lehman's Vegetable Milk". This was prepared out of beans like the soya and almond. The milk had a thick consistency, brown colour and a pleasant aroma. It had a composition of 7 per cent vegetable protein, 25 per cent fat, and 42 per cent sugar. One teaspoon of this vegetable milk with a pound of ordinary milk and a pound of water made a nourishing mixture, rich in fat and sugar though poor in protein. But this preparation had a farinaceous taste.

In recent times refined methods have been adopted for the preparation of milk substitutes. The details of processing are as follow. Ground beans are moistened, allowed to stand for 8 hours, treated with steam to deodarise and emulsified by triturating with water and pressing out the milk. The emulsion is again boiled for 5 minutes, treated with salt, glucose and soya bean oil, vanilla or almond extract added, agitated in a shaking apparatus and sterilised. Refined fat is also sometimes incorporated by emulsification at 60°C. In another process the seeds are germinated and ground with whey, water or skim milk, the pulp heated and fermented with enzymes to break down the proteins and carbohydrates, emulsified with vitamin-containing substances, homogenised

and dried by atomising in hot gases. The product is reported to be useful in rearing calves.

The practice of adding coconut 'milk' (prepared by kneading the scraped kernels with small quantities of water and pressing through cloth) to certain preparations is well known on the West Coast. The poorer classes sometimes use it with coffee as a substitute for milk. Cotton seed milk is known to be useful to nursing mothers for increasing milk secretion.

The purpose of the present studies was to see if milk can be prepared economically from oilseeds or pulses other than soyabeans and the quality of such preparations.

Materials and Methods: Trials were made in the laboratory on the preparation of vegetable milk from pulses and oilseeds. The pulses tried were horsegram, bengalgram and lablab, and among the oilseeds groundnut, cotton-seed and coconut were used. The pulses were soaked in water for over 8 hours after thorough cleaning and then ground into a paste, emulsified with water, filtered through muslin, the filtrate boiled a short while and again passed through muslin. A similar procedure was adopted for cotton-seed also, but groundnut and coconut kernels were crushed without previous soaking and the milk extracted by squeezing through cloth. The milks were then tested for their palatability by distributing them to different persons both as milk and added to coffee and tea.

Experiments were also conducted with a view to effect improvements in the quality of these milks and to get rid of their characteristic unpleasant flavours, by grinding the seeds to flour, adding water in sufficient quantities, boiling and pressing through muslin. The milk obtained was of the same quality as that obtained by the process described earlier. In the case of horsegram and bengalgram milk the flour was made into a paste with water and allowed to stand for several hours after which steam was passed for 15 minutes. More water was then added and the mixture triturated, filtered through muslin and boiled.

Discussion: The colour, consistency, flavour and other properties of these milks and their chemical composition are given in Tables I and II. It will be seen that cotton-seed milk approaches cow's milk in nutritive value. Groundnut and coconut milk have high fat content, but the latter is poor in proteins. The milk from pulses have a lower fat content than cow's milk, but could be made up

to approximate to the composition of cow's milk by the incorporation of suitable quantities of fat.

The products from pulses had the characteristic flavour of the respective grains which could not be masked even by the addition of flavouring agents like vanilla essence. The remarks made about soya bean milk may be said to apply in a greater degree to these milks. Tasters were unanimous in their verdict that these milk substitutes were repulsive either alone or added to tea and coffee. Coconut milk and cotton-seed milk were not objectionable when mixed with coffee, but taken alone they had a characteristic taste which could not be described as unpleasant. The high fat content of coconut milk and its proportionately low protein value might lower its usefulness as a milk substitute. The product from cotton-seed alone appears to deserve further investigation by nutrition experts in regard to its digestibility and toxicity, if any. The attempts to remove the odour from horsegram and bengalgram by modified techniques resulted in products which were worse than those of milk prepared by other processes.

Conclusions: Attempts were made to prepare vegetable milk from some pulses, groundnut, coconut and cotton seed. The preliminary studies show that milk prepared from vegetable sources is not likely to replace or supplement cow's milk in the dietary of the people of this country. Elaborate investigations will be required in the direction of deodourising the raw products and assessing the digestibility and growth-promoting properties of the protein from the different sources before such substitutes can be recommended for general use. Even soya bean milk which is said to approach natural milk in many respects has not attained universal popularity and opinions are divided regarding its digestibility.

Acknowledgements: My thanks are due to Sri H. Shiva Rao, B. Sc., Dip. Agri. (Cantab), A. R. I. C., the then Government Agricultural Chemist for having given me the opportunity to take up this piece of work and to Sri K. Govindan Nair, Assistant Agricultural Chemist, for his interest and guidance in the work.

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TABLE I

Notes on Quality of Different Milk Substitute

Name of milk	Colour	Odour	Taste	On boiling	Whole milk relished or not	Added to tea	Added to coffee
Cotton seed	Yellowish	Smell of soaked cotton seed not unpleasant	Acidic, not pleasant	Colour changes to yellow. Fine curds formed	Not relished	Raw milk seems all right. But on keeping precipitates are formed. When boiled milk is added a precipitate is formed.	Flavour and colour not bad. Taste—slightly bitter.
Coconut	Milk-White	Aromatic not unpleasant	Good and nutty	Curdles	Not bad	Raw milk flavour is not much affected. Fine precipitate appears. Boiled milk curdles.	Raw milk flavour is not unpleasant. Boiled milk is also all right. There is some after taste in either case.
Groundnut	Brownish white	Of crushed groundnuts	Acid and sweet	Coagulates	Not relished	Raw milk curdles. Taste not good.	Mixes well—Taste not good.
Black gram	Greenish white	Strongly of germinating seeds	Insipid	Thickens	Repulsive	Raw milk does not curdle, but taste is bad. Boiled milk curdles.	Raw milk or boiled milk mixes well. The taste is bad.
Bab lab	Brownish	Strongly of lab lab	Insipid	No change but odour increases	Repulsive	Raw milk does not curdle. Boiled milk curdles. Not relished by people.	Raw milk has a strong odour of lab lab, odour is imparted to coffee. Boiled milk curdles. Not relished.
Bengalgram	Creamy yellow	Fresh vegetable odour	Insipid	Thickens	Unpleasant	Raw milk as well as boiled milk also curdles.	Raw milk mixes well. Boiled milk curdles. Taste not good.
Horse gram	Brownish white	Characteristic odour of horse gram	Insipid slightly acid	..	Unpleasant	Mixes well but taste is not good.	Flavour is not much affected. Slight sour taste lingers on for a long time.

TABLE II

Showing the Composition of the Various Vegetable Milks

Name of milk	Specific gravity	pH at 29° C	Acidity as number of milligrams of KOH per 100 ml. milk	Moisture	Ash	Protein	Fat	Carbohydrates
Coconut ..	0·997	6·39	56	79·33	0·50	1·68	16·15	2·34
Cotton seed ..	1·020	6·86	257·6	88·04	0·85	4·42	4·98	1·71
Groundnut ..	1·018	6·78	89·6	72·22	0·64	6·79	14·40	5·95
Blackgram ..	0·945	6·65	22·4	97·47	0·18	1·02	0·61	0·72
Lab lab ..	1·028	6·21	..	90·50	0·75	5·32	0·54	2·89
Bengal gram ..	1·024	6·42	..	90·72	0·31	3·04	0·52	5·41
Cow's milk ..	1·030	6·90	67	87·30	0·80	3·20	3·50	5·20
Soya Bean milk ..	..	..	..	87·03	0·52	2·40	0·15	6·90

The Improvement of the Quality of Straw in *Talaivirichan Cholam* (Sorghum Roxburghii) in Madras State

by

P. KRISHNA RAO, Millet Specialist

and

K. NARASIMHAMURTY, Assistant in Millets

Introduction: *Talaivirichan* Cholam (*Sorghum Roxburghii* var *hians* Stapf), (Snowden 1936) is one of the important Sorghum varieties in the Madras State. It has got rather a discontinuous distribution, being cultivated on the hill slopes of Visakhapatnam and East Godavari districts and after a long gap occurring again in the Central districts of Chittoor, North Arcot, South Arcot, eastern portions of Salem and in the north-eastern portions of Tiruchirapalli districts.

The stalks of *Talaivirichan* Cholam grow to a thickness of nearly 1½" diameter and are very coarse and pithy. The straw of this variety is not relished by cattle because of its coarseness, and it is generally used only for thatch and fuel purposes. There are no naturally occurring juicy-stalked types in this variety or in the varieties allied to it. The problem of improving the quality of straw to make it fit for fodder was taken up as one of the items of work in the improvement of Sorghums of Madras State.

With this object a juicy-stemmed type, A. S. 5945, isolated from a cross was selected as a parent and some of the high yielding *Talaivirichan* cholam varieties were crossed with it in 1938. During the subsequent generations selections were made and purified to obtain pure-breeding forms of juicy-stalked *Talavirichan* cholam.

The F_1. plants from the above crosses were all white-midribbed, since white midrib, which is indicative of pithy-stalked condition, is a simple dominant to dull green colour of the midrib, which indicates the juicy condition of the stalk (Rangaswamy Iyengar et al 1936). From the F_2. generation onwards segregations were obtained for juiciness and for certain other characters in which the parents were differing from each other. The process of selection from each generation was continued to obtain pure breeding forms for all characters including the juiciness of stalk. A. S. 7657, was finally selected as the best recombination. The first yield trial with it was conducted in 1950 main season with Co. 3 the standard strain of *Talaivirichan* Cholam. The results of the trial are presented below:

TABLE I

Selection	A. S. 7657	Co. 2	A. S. 8008	Co. 3	Critical difference
Grain yield as percentage of Co. 3 ..	132	116	115	100	16·1
Straw yield as percentage ..	102·2	96·1	97 6	100	Not significant

Note: Co. 2 and A. S. 8008, two other *Talaivirichan* Cholam selections were also included in the yield trial.

From the above four selections juice was extracted at the time of flowering and analysed for sucrose and glucose. The data are presented below as total sugars:

TABLE II

Selection No.		Extraction percentage	Total sugars in 100 lb. of stalks
A. S. 7657	..	22·5	0·9225 lb.
Co. 2	..	10·0	0·47 lb.
Co. 3	..	7·5 10·0	0·3728 lb.
A. S. 8008	..	10 0	0·558 lb.

To find out the relative food value of the selections and strains the straw was chemically analysed and the results of analysis are presented below:

TABLE III

(Results are expressed as percentages)

Particulars	Varieties							
	Co. 3		Co. 2		A. S. 8008		A. S. 7657	
	a	b	a	b	a	b	a	b
Moisture ..	6·84	..	7·17	..	7 35	..	7·88	..
Ash ..	7·34	7·88	6 86	7·39	7 35	7·94	9·65	10·47
Crude protein ..	2·73	2·93	3·82	4·12	4 29	4·64	6·04	6·56
Ether extractive ..	2·21	2 37	2 54	2·74	2·42	2 62	3·04	3·30
Crude fibre ..	28·72	30 83	21·24	22 89	25·05	27·03	22·31	24·42
Carbohydrates by difference ..	52·16	55·99	58·37	62·86	53 54	57·07	51·08	55·45
Total ..	100·00	100·00	100 00	100·00	100 00	100·00	100 00	100·00
Lime (CaO) ..	0·15	0·16	0·26	0·28	0·67	0·73	0·93	0·10
Phosphoric acid P_2O_5 ..	0·26	0·28	0·61	0·66	0·25	0·27	0·57	0·82
Nutritive ratio ..	20·98 : 1		16·78 :		13·74		9·61	

(a) Air-dry basis. (b) Oven-dry basis.

From the point of view of feeding, variety A. S. 7657 is the best of the lot, followed by A. S. 8008, Co. 2 and Co. 3 in descending order of merit.

It will be seen from Table I that the selection A. S. 7657 is significantly superior in grain yield to the standard Co. 3. In straw yield it was equal to the standard, with the advantage that the stalks are juicy.

The data in Table II show that the juicy-stalked selection A. S. 7657 has almost double the quantity of total sugars as in strain Co. 2 and nearly one and a half times more total sugars to that contained in Co. 3. The chemical analysis of straw presented in Table III showed that A. S. 7657 has the best fodder value. Feeding trials conducted with the straw of A. S. 7657 and the *Talaivirichan* cholam selections Co. 2 and Co. 3 indicated that the cattle relished the improved type better than the ordinary strains of *Talaivirichan* cholam.

Summary: *Talaivirichan* cholam is one of the important dry-land cholam varieties of Madras State. Its straw is inferior, being thick, coarse and pithy. To improve the fodder quality it was crossed with a juicy-stalked type and by selecting from the hybrid material through subsequent generations, one selection A. S. 7657, breeding pure for juiciness of stalk and other characters has been evolved. Its grain yields have been found to be significantly better than the standard. Its straw yield was equal to the standard and has the advantage of being juicy. It has practically double the quantity of total sugars to those of the standard, and has a better fodder value and palatability, as assessed by chemical analysis of straw and feeding trials.

Acknowledgments: The authors are indebted to the Government Agricultural Chemist for the analysis of the straw samples, for estimation of sugar and fodder value. The authors also express their thanks to Sri M. A. Sankara Ayyar, who effected the first cross.

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MADRAS

Note on the Presence of Branched Stigmas in *Pennisetum Typhoides*, Stapf and Hubbard.

In the cour-e of field stud'es on *Pennisetum typhoides*, (Cumbu or Pearl millet), during the monsoon season, 1951, an interesting morphological character was observed in the spikelets.

In Gramineae, the gynoecium has generally two styles each with one plumose stigma (1) in rare cases, as in a few types of *Bambusae*, three styles each having a sti ma may be present. The three-styled condition has been recorded in *Oryza grandiglumis*, Prodoehl, and in grain sorghums (2), (3) According to Walker (5) in the tricarpellate pistils of Andropogoneae, two of the carpels normally form the bulk of the ovary and bear the stylar branches while the third carpel bears the ovule. The normal pistil of *Pennisetum typhoides*, has only two styles which are generally connate at the base and each of the two styles has a single plumose st gma at its end.

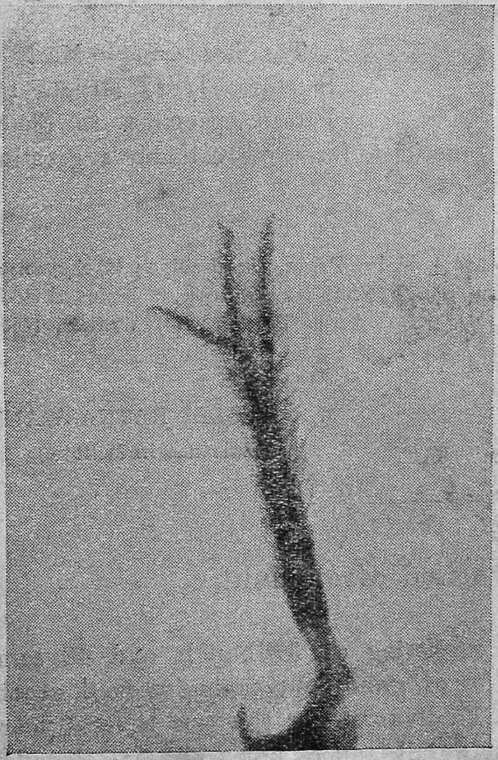

Fig. 1

Among the selections under study at the Millet Breeding Station, Coimbatore, two types, M. S 5965/6-2 selected from an African variety and M. S. 6355/6-1 selected from a Punjab variety, showed some of the panicles possessing a few spikelets having pistils with three or four stigmas (Figs 1 and 2). The extra stigmas do not show any morphological difference from the normal ones. In M S. 5965/6-1 in a single panicle of 994 spikelets, 24 spikelets had pistils with three stigmas and five with four stigmas while the rest had normal two stigmas. In another panicle, from the same selection, having 1,323 spikelets, 26 had pistils with three stigmas and two with four stigmas, while the rest possessed the normal two stigmas. The selfed progeny of the panicle that exhibited this peculiarity of branching of stigmas, when grown in the following season

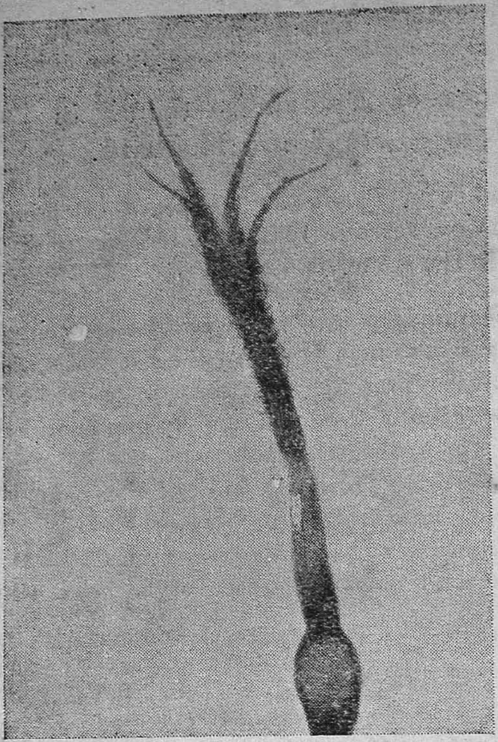

Fig. 2

(Summer 1952), repeated the behaviour. The other floral parts of these spikelets with three or four stigmas were normal in all characters. Ray (4) has recorded the presence of a third style in *Orzay sativa*, Linn. in eight varieties, in a proportion which was more than 42 percent. Two other varieties had more than 82 per cent of the florets containing this extra style. The presence of branched stigmas in Cumbu in particular selections and its repetition of the same behaviour in the following season cannot therefore be regarded as a mere freak of nature.

Thanks are due to Mr. M. A. Sankara Iyer, Millets and Pulses Specialist in charge and Dr. N. Krishnaswamy, Cytogeneticist, for their valuable suggestions in the preparation of this note.

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(1) Arber, A., 1934, The Gramineae. Univ. Press, Cambridge; (2) Ayyangar. G. N. R., et al (1935), Curr. Sci. 4 : 176; (3) Chandrasekharan, S. N., et al (1950), Curr. Sci. 19 : 291; (4) Ray, G. L, (1951), Sci. & Cult. 16 : 371; (5) Walker, (1906), Quoted in reference 2.

Millets Breeding Station,
Coimbatore,
August 1953.

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White - Kernelled Groundnut

An extensive collection consisting of 37 bunch and 48 semi-spreading and spreading varieties of groundnut is maintained at the Agricultural Research Station, Tindivanam for the past several years. These varieties were studied in detail and a key to their classification prepared by John, Narayana and Seshadri. Habit of growth and seed coat (testa) colour are the main characters based on which the different varieties are classified. Ninety-nine new varieties

obtained from various countries like Australia, East Africa, etc., were studied and their position fixed in one or other of the different sub-groups. But three white-seeded bunch varieties do not fit into any existing group. These varieties are pure-breeding and have attractive white-coloured kernels, the white colour being more pronounced than in A. H. 259 (Philippine white) — spreading variety.

The bunch varieties have been divided into four main groups depending on the seed colour, viz, (1) light rose (ii) rose (iii) red and (iv) dark purple. The three white-kernelled bunch varieties have to be placed in a new group in the classification list. Accordingly the following new group is constituted:—

White-kernelled bunch group: Varieties coming under this group are characterised by the almost complete absence of anthocyanin pigment on the stem and the leaves, pale green colour of leaves, absence of the crescent in the standard petal and white seed coat colour. This group is further divided depending on the kernelled nature of pods.

Type 1: 1—2 seeded pods; pods-small sized; deep to medium constriction; the back is peculiar with a distinct curve A. H. 6644 (East Africa).

Type 2: 1—3 seeded pods; pods-medium sized; medium to shallow constriction; the purple veinetion in the standard is slightly more pronounced than in type 1—A. H. 6728 and A. H. 6744 (both from Australia).

The white coloured nature of kernels is a very desirable character because such types will give an almost colourless oil and considerably reduce the cost of decolorisation of the oil in the Vanaspathi industry. Evolving a white-seeded type by crossing a high yielding pure line with A. H. 259 is one of the items in the breeding programme. The new short-duration white-kernelled bunch types are now being utilised for the same purpose. Selection work in these varieties has also been taken up to spot out high yielding pure lines, if any.

John C. M., Venkatanarayana G., and Seshadri C. R. - Variety and forms of the Groundnut(*Arachis hypogea* Linn). — Their classification and economic characsters (paper under publication with the Indian Central Oilseeds Committee). G. Venkatanaraya (1952)-Groundnut in Madras and its Economic Importance-Madras Agric. J.—Vol. XXXIX.

Agricultural Research Station,
Tindivanam, South Arcot District

M. BHAVANI SANKAR RAO
N. SRINIVASALU

Note on Caryota Urens. L. The Bastard Sago

Caryota Urens. L. a handsome palm indigenous to Ceylon, Malaya and India, thrives well under varied climatic and soil conditions but is mostly confined to elevations ranging from sea level to 2,500 feet, especially the rain forests. The tree attains its full size in 12–15 years reaching a height of 30–40 feet and bearing huge, long, pendulous, attractive infloresce nses after about 8 to 12 years of growth.

Propagation of the tree is only by seed. It has been commonly observed that the self-sown seeds germinate in 5 to 6 months. Experience at the Kallar Fruit Station has shown that the stored seeds generally lose their viability after six months. Trials on the germination of seeds under different treatments has shown that seeds pre-soaked in cold water for 24 hours recorded the maximum germination of 71·5 percent. The earliest germination by this treatment was observed in 90 days. Though the pre-soaking of the seeds in coconut milk reduced the period i.e., in 86 days, the percentage germination obtained thereby was far less. Scarification of the seeds with sand prior to sowing gave 66% germination. It was therefore evident that pre-soaking of the seeds in cold water for 24 hours prior to sowing ensures the best results in germination.

The economic uses of this tree are many. The leaves yield a strong, durable fibre popularly known as 'Kuttul or Kithul fibre' largely used in rope making, preparation of brushes, baskets and other articles. The fibre of the sheathing petiole gives the commercial bristle fibre which is used for making fishing twines. The long, pendulous inflorescences are often used for decoration The young inflorescence when cut, yields a copious supply of "sweet sap" or palm wine, from which brown sugar is manufactured The 'wine' as such is also consumed. The pith of the trunk of the mature tree yields an excellent sago. Bread, 'dosai' and thick gruel are made out of it. This is also a popular famine food in many parts of South India, especially on the hills. The immature seeds of the palm are sometimes used as adulterants with chopped arecanuts. They yield a blackish-red liquid when boiled with water and the dye is at times used for colouring arecanuts. The tree trunks are sometimes used as conduits for water. In view of these economic uses which it has, besides its graceful and ornamental appearance this palm deserves a large-scale cultivation in all suitable situations.

I. K. SAMBASIVA RAO, B. Sc. (Ag) D. I. H.

Correspondence

Sri B.W.X. Ponnaiya and L. Anavaradan write from the Agricultural Research Station, Koilpatti that in the Tenkasi area after the harvest of main season paddy black gram is sown mixed with a long duration sorghum 3 : 1½ lb. per acre. The local farmers know by experience that young sorghum plants are poisonous and often fatal. This effectively prevents the black gram being grazed by cattle. They recommend this usage to be tried in the case of *Sesbania speciosa* also.

Dear Sir,

We wish to draw your attention to the article on "Economics of chemical control of weeds control of *Portulaca quadrifida.* L. in West Godavari District (Madras Agric. J. XL. No 12/1953).

There also appears to be a mistake in calculating the amount of Extar 'A' required per acre. The article says 200 gallons of Extar 'A' spray per acre gave satisfactory results and that only 20 gallons were required for the second spraying to achieve complete control. Therefore, the amount of Extar 'A' required for two sprayings i.e. for 200 gallons at conc. of 0·8% works out to 18 lb. per acre and not 44 lb. as shown in the article.

We would thank you to let us know if our above assumption is correct and if so to insert a note to that effect in the next issue of your magazine.

(From Messrs. Sandoz Products, Ltd., Bombay - 1. Dated 12—1—1954)

*   *   *   *

Sir,

There is no mistake in calculating the Extar Sandoz 'A' required per acre as 0·8% refers to DNOC content and not that of Extar 'A'. 0·8 strength of DNOC is contained in 2 lb. of Extar A. To make 0 8% strength of DNOC 2 lb. of Extar A should be dissolved in 100 lb. of water or 10 gallons of water. To make 220 gallons of spray fluid containing 0 8% of DNOC 44 lb. of Extar Sandoz A. are required. At Rs. 3—2—0 per lb., 44 lb cost Rs. 137—8—0.

(From P. Govinda Rao, B. Sc. (Ag.), Agricultural Mycologist, Bapatla. Dated 1—2—1954).

Government of Madras G. O. Ms. No. 253; dated the 2nd December, 1953, Agriculture Department—Extracts

Order: In its petition read above, the Association of Upper subordinates of the Madras Agricultural Department, Coimbatore, has submitted certain resolutions passed at its general body meeting in November, 1952 for favourable consideration of the Government. The Government have examined the several points raised by the Association and pass the following orders:

*   *   *   *

The Association has represented that there should be no condition that an upper subordinate should submit his resignation, if he gets selected to a post under foreign service. The Government have decided that persons applying for appointment elsewhere need not give an undertaking to resign their posts in the Department if they get selected for the jobs applied for by them, though the question of forwarding an application for employment elsewhere will be decided with reference to the merits of each case, giving due regard to the exigencies of service. The question whether a person who succeeds in getting selected for a post elsewhere should be allowed to take it up or not and if allowed under what conditions shall, however, be within the absolute discretion of Government.

The Association has stated that every third vacancy in the Gazetted Posts of District Agricultural Officers is now filled by direct recruitment and has requested that direct recruitment to these posts may be stopped for some years to alleviate the stagnation among senior hands. The statement of the Association is incorrect as the ratio of appointments by direct recruitment and those by transfer is 1 : 4 and 1 : 2. The question of reducing the proportion of substantive vacancies to be filled by direct recruitment to gazetted posts of District Agricultural Officers was considered before by the Government. The Director of Agriculture then proposed to stop direct recruitment to the posts but the Government did not accept the proposal. The Government have further examined the question in consultation with the Director of Agriculture and now direct, with the concurrence of the Public Service Commission that the proportion of substantive vacancies to be filled by direct recruitment and transfer shall be reduced from 1 : 4 to 1 : 7 Necessary amendments to the Special Rules for the Madras Agricultural Service will issue separately. (By order of the Governor of Madras).

* * * *

Government Loans to Ryots of Nilgiris District for Soil Conservation

Government have approved in G. O. Ms No. 1. Agricultural Department dated 21—1—1954 that the ryots of Nilgiris District may be granted loans under the Madras Land Improvement Act upto a maximum of Rs. 1,500/- per ryot for carrying out soil conservation works. The loan will be granted by the Revenue Department subject to the following conditions.

(i) Only 50% of the loan amount will be given before the execution of the work and the balance 50% will be given after the completion of the work.

(ii) The work should be carried out as per the directions of the Assistant Agricultural Engineer, Soil Conservation Scheme, Ooty or his staff who will mark out contour lines and render all help in the execution of soil conservation. (Director of Agriculture).

* * *

The following student scholarships are available under Fulbright Programme: (a) *United States Government Scholarships* · These scholarships provide full support, inclnding tuition and maintenance. The amount of the scholarships varies from university to university according to the cost of living, usually from ranging $ 125 00 to $ 180·00 per month.

(b) *Scholarships and Assistantships*, given by private organisations. (These are also offered through the Institute of International Education and applications are received by the Foundation).

(c) *Travel Grants* (Fulbright), provide round-trip travel between India and America to supplement the scholarships described above.

The announcement of the competition for full scholarships including travel is usually made in the Press in July of each year for the following academic year commencing in September Competition is open for one month, from mid-July to mid-August. These scholarships are available for *one academic year only*. There are no written examinations. If a candidate fulfills the minimum requirements he may secure a preliminary application from one of the addresses listed below. These will be distributed *only at the time of the competition.*

The Executive Secretary, United States Educational Foundation in India; 17, Curzon Road, New Delhi.

Or to the nearest Cultural Officer, United States Information Service, *(i) 158 Mount Road, Madras (ii) Adelphi, 3 Queens Road, Bombay (ii) 7 Chowringhee* Road, Calcutta 13.

Minimum Requirements: For the 1953—54 student scholarship competition, an applicant must satisfy the following minimum requirements :

(a) Possess a post-graduate degree or diploma. Either this or the Bachelor's degree must be a first class; (b) Have two years of experience in the field of his specialization following the post-graduate degree or diploma; (c) Be between 24 and 35 years of age at the time of application; (d) Be in India at the time of application and selection; (e) Not have studied previously in the United States at the college level; (f) Be a citizen of India; (g) Be in good health; (h) Be proficient in English.

The scholarships are available only in the humanities, social sciences, (theoretical and applied), and in the pure sciences. No applications in applied sciences, technologies and medicine are accepted. Regulations governing qualifications and fields of study can be changed annually by the Board of Directors.

Fulbright Travel Only: A second competition is held in the spring of each year for those students who need only a Fulbright travel grant. Competition for such grants is open usually from *January to the middle of April. A travel grant* will cover the cost of transportation from the grantee's home in India to his destination in the United States and return by the most direct route. In order to apply, the student must present to the United States Educational Foundation in India (1) an official letter of admission from an American university for the September session, and (2) proof of adequate financial support, either in the form *of grants from the university* or from private funds amounting to at least Rs. 10,000/- for each year of study. Requests for applications must be accompanied by these two documents. All documents, unless in original, *must be properly certified* by a first class magistrate. Applications for travel grants will be received in all fields of study but preference will be given to the arts, humanities, social sciences and pure sciences. In general the same qualifications apply as in the scholarship competition.

The Foundation is responsible for making travel arrangements for all grantees receiving Smith-Mundt awards and Fulbright travel grants.

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Extracts and Gleanings

Brackish Sea or Salt Water Converted to Pure Water: Demineralization of brackish water for agricultural, irrigational, industrial and household purposes has been made possible by research both in India and U. S. A. The traditional method of distilling is too expensive. But in the past two decades research has helped to remove the salt from the water instead of the water from the salt as in distillation. One of the most promising processes known commercially in U. S. A. is the Nepton Demineralizer technique. It consists of newly invented plastic membranes which have the capacity of breaking up the salt into sodium and chlorine ions, the ions are divided and passed into waste channels and pure water run off by a separate channel. In India, work has been done in laboratory scale at the National Chemical Laboratories, Poona, Fuel Research Institute, Jeolgora (Dhanbad) and the Indian Institute of Science, Bangalore, to convert brackish water into pure water. This has been mainly by the use of ion-exchange material. (American Reporter, December 23, 1953) (A. M. K.)

Early Spraying of Plants Urged to Prevent Blight: Spraying or dusting fungicides on potato and tomato plants when they are just beginning to sprout will remove the danger of any crop destruction caused by late blights. Blights develop during cool damp weather and spraying or dusting during this period will keep plant diseases under control. Tomato plants should be sprayed or dusted two or three weeks after the plants have been set in the field. Continued spraying at weekly intervals during the damp period is recommended for both.

On tomatoes the blight causes a firm rot, usually starting near the stem end. The tomato skin becomes wrinkled and develops brownish-green specks or blotches. The rotted spot may spread over one-third to one-half of the fruit within two days. Sprays and dusts that will help control the blight may also contain chemicals that will control insects. (51—A—10.)

Ethylene dibromide is used as a fumigant on perishable foods to destroy the Oriental fruit fly, the melon fly, and the Mediterranean fruit fly without during to the commodity. The chemical is applied to the commodities at the rate of 1 pound per 2,000 cubic feet of space over a two-hour period at 70 degrees Fahrenheit. The treatment is for use on avocados, bell peppers, melons, bananas, cucumbers, papayas, pine-apples, string beans, and squashes. (American Agriculture, 51—A—12. 1951) (T. V. S.)

AGRICULTURAL NEWSLETTER

Animal Husbandry: *Treatment of mastitis*:— Mastitis is an inflammatory condition of the mammary glands. It is frequently seen in heavy milkers and is due to infection of the gland by micro organisms. The commonest organisms responsible are Streptococci and Staphylococci. Clinically two forms of mastitis are seen, "acute and chronic". Infection takes place through the teats either from the unhygienic surroundings or more commonly through wounds on the teat and udder caused accidentally by rough milking, tread-wounds from adjacent animals or wounds caused by horns or other sharp objects.

In the acute type there is an immediate increase in the size of the quarter. The quarter is hot and painful, red in colour and the animal resents milking or manipulation of the udder. The milk in early stages might not show any change but after some time, gets clotted and tinged with blood and will not flow freely from the teat. In the chronic form there is no appreciable change at first except a gradual reduction in milk yield and reduction in the size of the quarter. In some

cases, if neglected, the quarter might get completely atrophied. The milk has also a tendency to curdle on boiling. Flakes may be found when stripped on to a black cloth, It is a good practice to test even apparently healthy cows in this manner periodically. With the advent of modern antibiotics, treatment is successful in 75 per cent of the cases, if the condition is detected in time before serious damage to the gland is caused. Neglect may lead to complete loss of one or more quarters. The help of a Veterinary Surgeon should be sought without delay.

Milking animals should be kept in hygienic surroundings. Before and after milking, the quarter should be cleansed with a weak antiseptic lotion as Dettol or Cetcvelon (I. C. I) one per cent solution. Wounds in the region of the udder and teats should not be neglected as they are likely to come in contact with dung and urine. Hence, they must be immediately cleaned with an antiseptic ointment or Penicillin ointment.

Fisheries : Stepping up production of fish protein is tackled by the Fisheries Department on four major lines i. e., (1) Increasing the harvest of fish crop by intensified stocking of inland waters with suitable quick-growing fish seeds and side by side with judicious and scientific exploitation of waters (2) prevention of spoilage at every stage by providing quick transport facilities and installation of cold stores at important production centres, (3) intensified deep-sea fishing operations with motor vessels and the mechanisation of indigenous craft and (4) supply of essential articles like salt, yarn, sail cloth, etc., to fishermen at subsidised rates.

There are about 4 lakhs acres of inland waters in the State, of which 15,000 acres have been stocked with suitable quick-growing carps like Catla, Cirrhina, Labeo and Chanoes, etc. Arrangements are being made to populate the remaining waters also with quick-growing species of fishes. Fish seeds are distributed to interested pisciculturists at concessional rates by the Fisheries Department. (Director of Information and Publicity, Madras).

Examination question :— Write short notes on Theory of acquired characters.

Answer-1. Example - Zerophy. The elongation of the neck is an acquired character.

Answer-2. Another example can be given. Suppose a child born to a good family brought and fed under robbery atmosphere. The child will be gradually acquires the robbery atmosphere and in course of time become an outstanding robber. But his genotype is not robber but he got this from atmosphere.

Weather Review — For the month of January, 1954.

RAINFALL DATA

Division	Station	Total rainfall for the month in inches.	Departure fromnormal in inches	Total since 1st January in inches
North	Madras (Meenambakkam)	2·7	+ 1 3	2·7
	Tirurkuppam*	3·1	+ 2·2	3·1
	Vellore	2·3	+ 0·8	2·3
	Gudiyatham*	2·0	+ 1·8	2·0
East Cost	Palur*	2·7	+ 0·7	2·7
	Tindivanam*	3·0	+ 1·6	3·0
	Cuddalore	5·2	+ 2·8	5·2
	Nagapattinam	4·9	+ 2·2	4·9
	Aduturai*	2·6	+ 1·0	2·6
	Pattukottai*	4·2	+ 2·3	4·2
Central	Salem	1·0	+ 0·7	1·0
	Coimbatore (A. M. O.)*	3·4	+ 3·2	3·4
	Coimbatore	3·5	+ 2·9	3·5
	Tiruchirappalli	1·8	+ 1·0	1·8

Division	Station	Total rainfall for the month in inches.	Departure fromnormal in inches	Total since 1st January in inches
South	Madurai	3·4	+ 2·6	3·4
	Pamban	2·7	+ 0·1	2·7
	Koilpatti*	4·4	+ 3·8	4·4
	Palayamcottai	3·3	+ 1·6	3·3
	Ambasamudram*	7 7	+ 5·2	7·7
West Coast	Trivandrum	2·1	+ 1·3	2·1
	Fort Cochin	1·5	+ 0·6	1·5
	Kozhikode	0·2	J. N.	0·2
	Pattambi*	0·0	— 0·1	0·0
	Taliparamba*	0·5	+ 0 4	0·5
	Wynaad*	Tr.	— 0 4	Tr.
	Nileshwar*	0·3	+ 0·1	0·3
	Pilicode*	0·2	— 0 1	0·2
	Mangalore	0·3	J. N.	0 3
	Kankanady*	0·4	+ 0·4	0·4
Hills	Kodaikanal	6·8	+ 3·6	6·8
	Coonoor*	8·4	+ 4·5	8·4
	Ootacamund*	2·0	+ 1·1	2·0
	Nanjanad *	1·8	+ 1·0	1·8

Note.— 1. * Meteorological Stations of the Madras Agricultural Department.

2. For Kanakanady actual rainfall and deviation are respectively 44 and 37 cents.

3. Tr = 1 to 4 cents of rain-fall.

4. J. N. = Just Normal.

Weather Review for January 1954

The month began with a western disturbance over Vindhya Pradesh and east Uttar Pradesh. It became unimportant the next day and continental air prevailed practically over the entire country. In the subsequent eight days western disturbances occurred in different parts of the country. On 11-1-1954 under the influence of a secondary western disturbance, moving eastwards across Maldivies area, considerable incursion of moist air took place in the extreme South Peninsula. For four days thereafter a few isolated western disturbances were observed. On 16-1-1954 dry continental air prevailed in the country outside the extreme South Peninsula and upper Assam. A cyclonic circulation existed over Sind on the next day. The developments that ensued in the succeeding two days resulted in the incursion of moist air in the North East India upto 3,000 ft. a. s. l. This disturbance continued for two days.

On 23-1-1954 North-west India, South-west Uttar Pradesh, the Central parts of the Country and Chota Nagpur experienced cold wave. The remaining portion of the month went off with a few western disturbances noted in different parts of the country.

Almost all the districts in the Madras State had some showers in January, 1954. The districts constituting the southern region received fairly good rains. In regard to noteworthy falls only Coimbatore recorded 2·00" of rain on 5-1-1954. Details of the zonal rainfall are furnished hereunder:

S. No.	Name of the Zone	Average rainfall for the month in inches	Departure from normal in inches	Remarks
1.	North ..	2·53	+ 1·53	Above Normal
2.	East Coast ..	3·77	+ 1·77	do.
3.	Central ..	2·43	+ 1·95	do.
4.	South ..	4·30	+ 2·66	do.
5.	West Coast ..	0·55	+ 0·22	do.
6.	Hills ..	4·75	+ 2·55	do.

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, —2—1954.

C. B. M. & M. V. J.

A young author wrote asking a famous editor for advice on writing successful short stories.

The editor replied that it must be short and to the point, (2) it should contain a religious touch, (3) have some reference to the aristocracy (4) have action and (5) also some sex appeal. Next day the author sent along the following: "Good Heavens!" said the Duchess, "You're pulling my leg!".

Departmental Notifications

Gazetted Service—Postings and Transfers

Madras State: Francis, T. S , D. A. O. Ootacamund, Senior D. A. O. Crop Sampling, Madras; Krishnaswami, P. N., Cotton Certification, Asst. Rajapalayam, Gazetted Asst. to Cotton Certification Officer, Rajapalayam; Krishnamurthy, K. S., D. A. O. on leave, D. A. O. Madurai; Mohamed Ali, Senior D. A. O. Crop Sampling, Madras, Dy. Director of Agriculture, Madurai; Mayandi Pillai, Asst. Cotton Specialist, Koilpatti, Cotton Certification Officer, Rajapalayam; Narayanan, N. G., Asst. Cotton Specialist, Srivilliputhoor; Rangaswami, T. V., Asst. Cotton Specialist, Coimbatore, Cotton Certification Officer, Rajapalayam; Ramachandran, C. K., Asst. Cotton Specialist, Srivilliputhoor, Asst. Cotton Specialist, Koilpatti; Srinivasa Rao, B., D. A. O. under Training, Madras, D. A O. under Training Tanjore; Santhanam, V., Asst. in Cotton, Asst. Cotton Specialist, Coimbatore; Santhanam, K., D. A. O. Madurai, D. A. O. Ootacamund; Umapathy, M., Asst. Agrl. Eng. (Tractor Workshop) Coimbatore, Asst. Agrl. Eng. (Inspection) Madurai.

Upper Subordinates

Achuthan Nair, P. P. A. (Mycol.) Tellichery, F. M- Live Stock, Bhimanad; Bhoominathan, Asst. in Cotton Coimbatore, Cotton Certification Inspector, Rajapalayam; Damodaran Nambiar, P. K., A. A. D. Kalpatta, A. D. Cananore; Govinda Nair, K. V., F. M. Bhimanad, P. P. A. (Myco) Tellichery; Hariharan, S. V., A. D. for Training Maistries, A. D. T , A. D. Ambasamudram; Kandaswami, T. K., Asst. in Mycol. Coimbatore, F. M. Pattukottai; Kannan Nambiar, A. D. Cananore, A. D. Badagara; Krishnamurthy, K., A. D. Tiruvellore, Development Block, Chingleput; Kolandaivelu Naicker, K , A. D. Ponneri, A. D. Kanjeevaram; Krishnamurthy, C., A. D. Sriperumbudur, F. M. Satyamangalam; Karuppannan, P., A. D. Uthamapalayam, Spl. A. D. Gandhiram; Mathews, V. G., A. D. under Training, Taliparamba, A. A. D. Kalpatta; Meenakshisundaram, Marketing Asst. Madras, A. D. Vegetables, Madras; Ranganathan, P. S., Asst. in Ent. Coimbatore, P. P. A. Vellore; Ramiah, S M., A. D. Nangeneri, Spl. A. D. Cheranmadevi; Raghavan, K., A. D. Vegetables, Madras, A. D. Sriperumbudur; Thiruvengadaswami, K. R., Soil Conservation Asst. Dharapuram, Soil Conservation Asst. Ketty, Lalley Extension Scheme; Thanikachalam, T. K., A. D. Canjeevaram, Spl. A. D. Lalgudi; Thankavelu, T. K., (on leave) Marketing Asst. Madras; Subramaniam, C. P., Asst. in Mycol. Coimbatore, A. D. Ponneri; Vedachalam, C. D., A. D. Ponneri, Soil Conservation Asst. Dharapuram; Venkateswaran, A. N , Asst. in Oil Seeds, Coimbatore, Coconut Nursery Asst. Marudur; Viswanathan, T. K., A. A. D. Walajah, Marketing Asst. Elluru; Venkataraman, T. M , on leave, Fruit Asst. Model Orchard Nurseries, Periakulam; Balasubramaniam, R., Fruit Asst. Model Orchard Periakulam, Asst. in Tuber crops, Coimbatore; Chandrasekharan, P., Asst. in Cotton, Coimbatore, Asst. in Paddy, Coimbatore; Jayaraman, M. V., Fruit Asst. Cashew Scheme. Mangalore, Cotton Asst. Coimbatore; Natarajan, L. R., Asst. in Ento. A. D. T Marketing Asst. Tanjore; Krishnamurthy, A. R., Asst. in Paddy, Coimbatore, Asst. in Cotton, Coimbatore; Sethuraman, S., Asst. in Tuber, Coimbatore, Asst. in Paddy, Coimbatore; Wazir Hussain, Cotton Asst. Coimbatore, Fruit Asst. Cashew Scheme, Mangalore.